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128th Annual Report of the New York State Museum and Science Service

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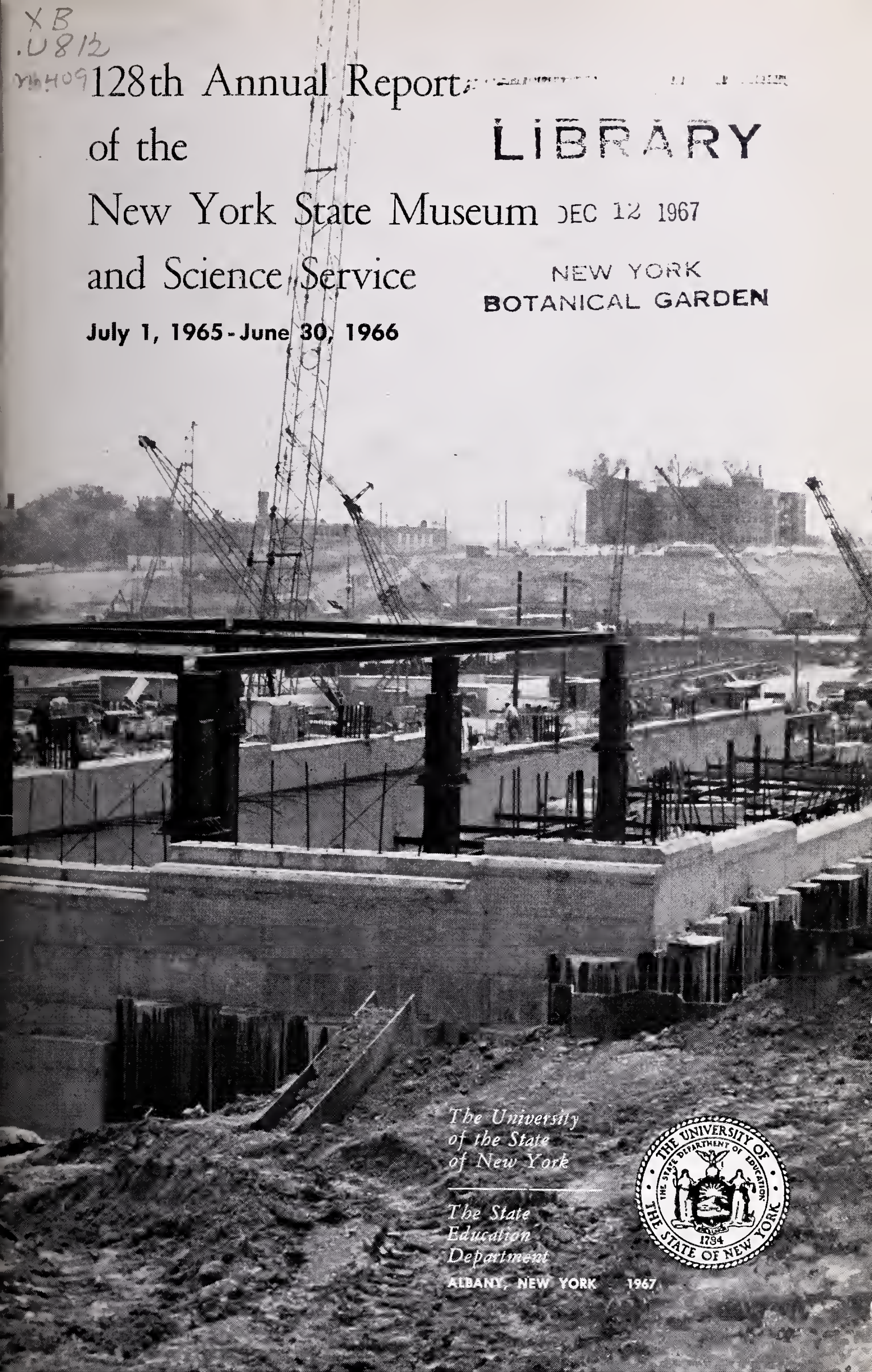

*The University
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*The State
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ALBANY, NEW YORK 1967

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128th Annual Report of the New York State Museum and Science Service

MUSEUM BULLETIN NUMBER 409

The University
of the State
of New York

ALBANY, NEW YORK

The State
Education
Department

1784

1967

THE UNIVERSITY OF THE STATE OF NEW YORK

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1968 Edgar W. Couper, A.B., LL.D., L.H.D., *Chancellor* - - Binghamton
1970 Everett J. Penny, B.C.S., D.C.S., *Vice Chancellor* - - White Plains
1978 Alexander J. Allan, Jr., LL.D., Litt.D. - - - - - - - Troy
1973 Charles W. Millard, Jr., A.B., LL.D. - - - - - - - Buffalo
1972 Carl H. Pforzheimer, Jr., A.B., M.B.A., D.C.S. - - - Purchase
1975 Edward M. M. Warburg, B.S., L.H.D. - - - - - - - New York
1969 Joseph W. McGovern, A.B., LL.B., L.H.D., LL.D. - - New York
1977 Joseph T. King, A.B., LL.B. - - - - - - - - - - Queens
1974 Joseph C. Indelicato, M.D. - - - - - - - - - - Brooklyn
1976 Mrs. Helen B. Power, A.B., Litt.D. - - - - - - - Rochester
1979 Francis W. McGinley, B.S., LL.B. - - - - - - - Glens Falls
1981 George D. Weinstein, LL.B. - - - - - - - - - - Hempstead
1980 Max J. Rubin, LL.B., L.H.D. - - - - - - - - - New York
1971 Kenneth B. Clark, A.B., M.S., Ph.D. - - - - - - - Hastings on Hudson
1982 Stephen K. Bailey, A.B., B.A., M.A., Ph.D., LL.D. - - Syracuse

President of the University and Commissioner of Education
James E. Allen, Jr.

Deputy Commissioner of Education
Ewald B. Nyquist

Associate Commissioner for Cultural Education
Hugh M. Flick

Assistant Commissioner for State Museum and Science Service
William N. Fenton

Assistant Director, State Museum
Victor H. Cahalane

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Contents

iv MUSEUM ADVISORY COUNCIL

v THE STAFF

1 GENERAL STATEMENT

7 ACCOMPLISHMENTS OF THE SCIENCE SERVICE

7 Anthropological Survey

13 Biological Survey

19 Geological Survey

29 THE MUSEUM

35 PUBLICATIONS

39 APPENDICES

Museum Advisory Council

1966	GEORGE F. GOODYEAR	Buffalo
1967	CHESTER M. SUTER	Chatham
1968	VACANT	
1969	VACANT	
1970	VACANT	

The Staff

State Museum and Science Service

WILLIAM N. FENTON	Assistant Commissioner

Anthropological Survey

WILLIAM A. RITCHIE	State Archeologist, Associate Scientist
ROBERT E. FUNK	Junior Scientist

Biological Survey

DONALD L. COLLINS	State Entomologist, Principal Scientist
DONALD P. CONNOLA	Senior Scientist (Entomology)
PAUL F. CONNOR	Scientist (Zoology)
RODNEY C. DE GROOT	Senior Scientist (Botany)
HUGO A. JAMNBACK, JR.	Senior Scientist (Entomology)
DONALD M. LEWIS	Scientist (Botany)
EUGENE C. OGDEN	State Botanist, Associate Scientist
RALPH S. PALMER	State Zoologist, Associate Scientist

Geological Survey

JOHN G. BROUGHTON	State Geologist, Principal Scientist
JAMES F. DAVIS	Scientist (Geology)
DONALD W. FISHER	State Paleontologist, Associate Scientist
Y. WILLIAM ISACHSEN	Associate Scientist (Geology)
W. LYNN KREIDLER	Senior Scientist (Geology)
KAREN J. LUKAS	Junior Scientist
GEORGE O. MARCH	Cartographer
R. LYNN MOXHAM	Senior Scientist (Geochemistry)
LAWRENCE V. RICKARD	Senior Scientist (Paleontology)
ARTHUR M. VAN TYNE	Scientist (Geology)

State Museum

VICTOR H. CAHALANE	Assistant Director

Curatorial

VACANT	Associate Curator (Geology)
JENNIFER CHATFIELD	Associate Curator (Interpretation)
CHARLES E. GILLETTE	Associate Curator (Archeology)
CLINTON F. KILFOYLE	Associate Curator (Paleontology)
EDGAR M. REILLY, JR.	Associate Curator (Zoology)
STANLEY J. SMITH	Associate Curator (Botany)
JOHN A. WILCOX	Associate Curator (Entomology)

Exhibits

HELEN C. FISHER	Museum Technician (NDEA)
EDITH FROELICH	Museum Technician
LEWIS E. KOHLER	Museum Technician
LOUIS J. KOSTER	Senior Museum Technician
HAROLD W. ROSS	Museum Technician (NDEA)
ROBIN D. ROTHMAN	Museum Technician
THEODORE P. WEYHE	Museum Exhibits Designer

School Services

MARGARET K. CLARKE	Museum Instructor (NDEA)
VACANT	Museum Education Supervisor
PAUL WEINMAN	Museum Instructor

Library

EILEEN COULSTON	Librarian, Junior Scientist

Clerical

PHYLLIS M. COZZOLINO	Stenographer
ROBERTA A. DOYLE	Stenographer
ALICE A. GADOMSKI	Stenographer
RENEÉ GIGNAC	Stenographer (NDEA)
JOAN C. KELLEY	Senior Stenographer
ROSELLE LITHGOW	Clerk
HELEN B. LOUER	Typist
MARJORIE R. SCHMIDT	Principal Clerk
GRACE SMITH	Senior Stenographer
MARY C. STEARNS	Stenographer
EILEEN A. WOOD	Senior Stenographer
VACANT	Mail and Supply Helper

Guards

JOHN C. CUNNINGHAM	Building Guard
ANTHONY GENSICKI	Building Guard
EDWARD W. MC CARTY	Building Guard
WILLIAM C. ZIMMER	Museum Caretaker

Photographer

HAROLD C. FURLONG	Museum Photographer

Maintenance

JACOB SMALLENBROEK	Carpenter
VACANT	Maintenance Man (Carpenter)

General Statement

Work will begin shortly on a Cultural Center for New York State, which will be an integral part of a vast State building complex now being constructed in downtown Albany. The Center, which will house the public facilities, office space, and specialized work areas of the New York State Museum and Science Service, the New York State Library, and the Division of History and Archives, is scheduled for completion by 1971.

The Cultural Center will be one unit in the major new administrative and services center named the South Mall. This complex of structures is adjacent to and south of the State Capitol, on 98.5 acres acquired by the State for the South Mall development.

According to the architect's drawings, the landscaped mall will consist of a 3-deck platform some 1,000 feet long. The platform's three levels will be devoted to cafeterias, a central post office, and other public facilities, and from the main platform will rise five large office buildings to accommodate numerous State agencies, a meeting center, a legislative office building, and a justice building.

The Cultural Center will adjoin the main platform at the south end of the Mall opposite the State Capitol. Among the State's treasures to be prominently exhibited is the original draft of Lincoln's first Emancipation Proclamation. From this historic document is derived the primary purpose of the Cultural Center: emancipation of the people through education.

For the New York State Museum and Science Service the prospect of a new building promises to fulfill the dreams of 4 directors during 50 years.

All activities of the present facility, which is inadequate in size and has marked disadvantages for scientific work, are carried on in about 95,000 square feet of space, mostly on the 5th floor of the New York State Education Building which was erected in 1912.

The proposed State Museum's main exhibition floor will contain about 135,000 square feet. Here the museum planners will outline the physical and natural sciences, with particular reference to New York, and summarize the story of man in the Province and the State, illustrating the story with artifacts from the extensive archeological and historical collections.

An orientation center, seating 400 persons and equipped with the latest electronic teaching devices, will be a special feature of the museum.

The two lower levels of the proposed building will contain mechanical facilities and certain supporting services: additional storage areas for the library and museum and shipping-receiving docks.

Information on museum building planning, exhibits, education methods and curating problems was gathered by Mr. Victor H. Cahalane, Assistant Director of the State Museum, in studies at the American Museum of Natural History, the Smithsonian Institution, the Milwaukee Public Museum, and the Carnegie Museum. In mid-year the Assistant Director was detailed to work exclusively on plans for museum space in the Cultural Center. Other staff members, notably Miss Jennifer Chatfield, Associate Curator (Interpretation), Dr. John G. Broughton, State Geologist, and Dr. Donald W. Fisher, State Paleontologist, have spent much time preparing data required for the architect's use.

The two other organizations that will share the Cultural Center building — the State Library and the Division of Archives and History — have collections which complement the holdings of the State Museum and Science Service and which add significantly to the latter's research capacities. The New York State Library has a notable collection of manuscripts and printed materials relating to the development of science throughout the State and nation during the 19th century.

Also, the proximity of the New York State Department of Health building, with its large staff of medical and chemical scientists and its important library resources, promises support to botanists, entomologists, ornithologists and mammalogists on the staff of the State Museum and Science Service.

What will be the functions of the New York State Museum and Science Service in the proposed Cultural Center?

To answer this question, a brief look at the history and the present functions of the organization may be helpful.

The New York State Museum began with the establishment of the Geological Survey of New York in 1836, although the Museum itself was not founded until 1878, with the Science Service added as its research arm in 1945. The present State Museum and Science Service is a unit of the New York State Education Department, which is the operating agency of the Regents of the University of the State of New York.

Programs of exhibit, education, and publication are carried on by the State Museum. Research activities, which serve all the departments of the State and the residents of the State, are the function of the Science Service.

The general purpose of the State Museum is threefold: 1) To preserve and to collect the type specimens which are the tangible and irreplaceable records of the earth's history of ancient and modern life, and of man's career in New York State; 2) To increase knowledge through research; and 3) To use the collections and related materials in all appropriate ways for educational programs and activities in keeping with the objectives of the State Education Department.

Collections held by the State Museum were essentially field collected and, with certain exceptions, were not acquired by gift or purchase. They are, therefore, primarily research and reference collections. The collections, besides being used for research, are interpreted in various ways by means of exhibits, through publications, and serve as reference resources as well.

While the State Museum and Science Service does not grant degrees, it is a source of funds for field work for the staff and students of colleges and universities in the sciences of its competence. University scientists from a region that includes New York, New Jersey, and much of New England and southern Canada send their graduate students to our field programs and for on-the-job training while they are gathering material for dissertations. The students are also afforded bench space in the laboratories and have access to the Museum collections.

The State Museum, through its Graduate Student Honorarium program, also participates directly in the training of graduate students by annually affording opportunities for individual graduate students to undertake research on problems of their own choosing.

The State Museum will greatly expand its role in education through its Division of Museum Extension. This office advises and assists school authorities in planning, establishing and utilizing museum collections and exhibits for the enrichment of the curriculums of elementary and secondary schools.

The educational background of the staff of the State Museum and Science Service resembles a university faculty. A profile of 27 members shows: Median age: 40; terminal education: 1 high school diploma, four A.B. or B.S. degrees, 7 M.A. or M.S. degrees, and 17 Ph.D. degrees; honorary societies — 6 Phi Beta Kappa, 20 Sigma Xi; 2 honorary Doctors of Science, and several adjunct professors in neighboring universities.

As previously stated, the State Museum disseminates the results of staff research through its publications. Among the 400 scientific reports published by the State Museum during the last century, the most notable are the *Memoirs* which represent the Paleontology of New York, and the *Reports* of the Natural History Survey on birds, mammals, and wild flowers. Also important are four major publications of the last decade: 1) The Geologic Map and Correlation Charts of New York; 2) The *Handbook of North American Birds*, by Ralph S. Palmer; 3) *The Archaeology of New York State*, by William A. Ritchie; and 4) *The Blackflies of New York*, by Alan Stone and Hugo Jamnback, and *The Control of Blackflies in New York*, by Hugo Jamnback and D. L. Collins.

The authors of the latter four publications are scientists on the staff of the Science Service. It is the Science Service that has the responsibility to make original investigations which, depending on the area concerned, develop broad background information, complement the research carried on by other organizations, or help solve specific problems.

Because of the nature of the research responsibility, publications of the Science Service may range from definitive reports on *Early Man to Iroquois* to *Travels of Airborne Pollen*.

The three Surveys of the Science Service represent New York State's direct contribution to three major areas of science, traditionally grouped as the natural sciences. They are the Anthropological Survey (archeology and ethnology), the Biological Survey (botany, entomology, and zoology), and the Geological Survey (geology, paleontology, geochemistry, and geophysics).

What are the functions of each of the Surveys?

The Anthropological Survey is concerned with research into the aboriginal occupations of New York State from prehistoric times to the present. Through a combination of archeological and ethnological methods in the field, the laboratory, and in Museum collections, anthropologists attempt to describe in their entirety the cultures, languages, and social organization of the New York State Indians.

The Biological Survey has several well established lines of research which have a long history in the State Museum and Science Service and are not duplicated in other State agencies. Botanical research includes studies of aquatic plants, airborne pollen and its dispersion, fossil pollen, and wood-decaying fungi. The staff specialty is forest and medical entomology. The zoologists' major continuing projects are the multi-volume work on North American birds carried on in cooperation with the American Ornithologists' Union and a small-mammal survey which is an extension of a project to determine whether small mammals were reservoir-hosts to rabies.

The Geological Survey's function is to gather, analyze, and disseminate basic information about the bedrock, glacial deposits, ancient life, and mineral deposits of the State. Its investigations are not as broadly based as those of the U. S. Geological Survey, nor so specific except in work for other State departments in the capacity of private consultants. The research carried on in "pure" earth science is the foundation on which all later work and applications rests, and the survey has a long and outstanding tradition in basic research. Every area in which the Survey does applied research is backed up by an ongoing program in basic research.

Finally, the unit within the State Museum that serves all three scientific Surveys and the Museum staff is the State Museum Library. As a reference center, it contains scientific periodicals, reprints, pamphlets, and museum publications. The librarian charges books from the State Library for staff use and mails review copies and announcements for all State Museum publications.

Sections of the Annual Report which follow discuss the specific accomplishments of the State Museum and Science Service during 1965-66. I recommend these reports as evidence of the strides we are making in the research, educational, and service functions of our institution.

William N. Fenton
Assistant Commissioner for
State Museum and Science Service

Staff changes

Resignations during the year included Carol J. Lawson, Typist, August 5; C. Michael Darcy, Museum Education Supervisor, January 19; Ross P. Sangster, Science Research Aide in the Wellsville Office, March 2; James Wiedemann, Maintenance Man (Carpenter) May 18, and Roger L. Borst, Associate Curator (Geology), June 22. Joseph T. Killea, Mail and Supply Helper, retired June 1, as did John A. Heller, Photographer, September 30. The latter position was filled by Harold C. Furlong on January 6. George O. March was appointed Cartographer September 2. Reneé Gignac on July 8, and Roberta A. Doyle on July 15, were appointed to the vacant Stenographer positions. The Typist position was filled by Helen B. Louer September 1. Karen J. Lukas was appointed January 6 to the newly-created position of Junior Scientist in the Geological Survey.

The Science Service

The Science Service is comprised of three Surveys: Anthropological, Biological, and Geological. Staff members of the Surveys employ and augment the collections of the State Museum in their research.

ANTHROPOLOGICAL SURVEY

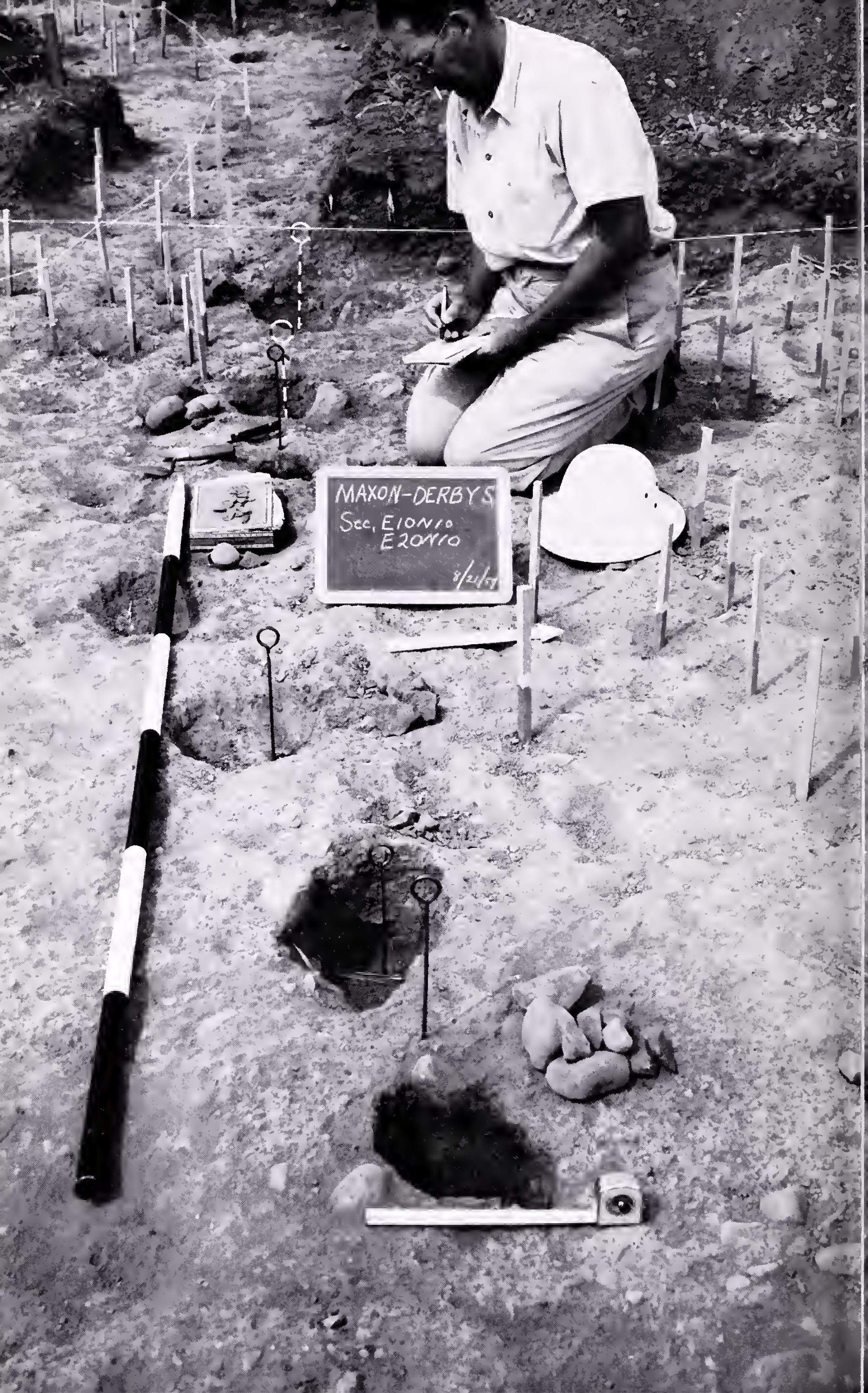
The Anthropological Survey conducts research into the prehistory and early history of the New York State aborigines. It also investigates the languages and cultures of their descendants, interpreting and relating all these data in a cultural-historical framework and chronology for New York and adjacent sections of the Northeast.

The principal archeological research accomplishments of the Survey relate to several phases of prehistoric culture in New York State and to a major study in environmental archeology in the coastal region of Massachusetts.

In eastern New York, the State Archeologist conducted excavations on the Nahrwold site, a large early Iroquois village at Middleburg, New York. Principally inhabited by early Iroquois groups and their immediate ancestors, excavations at this Late Woodland period site, radiocarbon-dated between A.D. 1310-1450, have resulted in new and significant data on formative Iroquois culture.

In the Genesee Valley of western New York, Robert E. Funk, Junior Archeologist, opened an Early Woodland camp site, among the largest known sites of its kind, having a carbon 14 date of 870 B.C. ± 60 years. This site produced considerable quantities of Vinette 1 ware, the oldest known pottery in the Northeast, and other remains of the Meadowood culture.

With National Science Foundation funds, the State Archeologist and a small party of graduate student assistants continued a long-term study of aboriginal settlement patterns in the Northeast, with emphasis on coastal adaptation. In June, work done on a site in Vermont yielded the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earliest known material of the Archaic stage of culture in the Northeast. During July, excavations were carried out on a large, stratified, prehistoric site at Martha's Vineyard, Massachusetts. The settlement pattern study is also providing the first stratigraphically based and radiocarbon-dated culture sequence for southern New England.

The cultural succession at Martha's Vineyard demonstrates the progressive adaptations, from Archaic times onward, of a whole series of specific inland cultures to a littoral and, finally, a full marine environment involving differential utilization of shellfish, fish, and marine mammals. Nearly all of these cultures have been radiocarbon-dated in a sequence of eight dates from the Martha's Vineyard excavations, falling between 2270 B.C. and A.D. 1380.

The Junior Archeologist continued a research project on the prehistory of the Hudson Valley. Data on the regional culture sequence begins in Paleo-Indian times and ends with the European contact period.

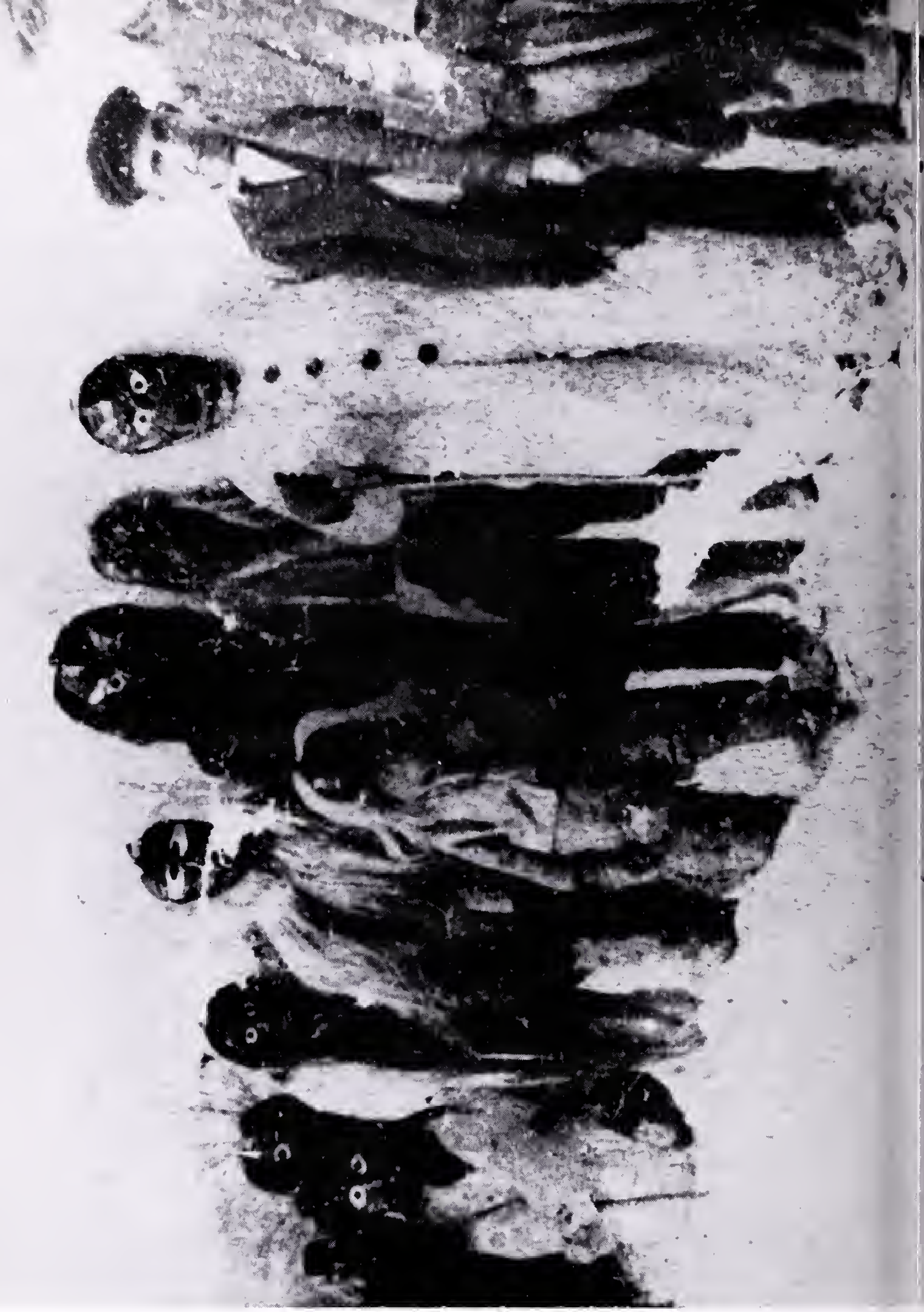
For his contributions to Iroquois prehistory, the State Archeologist was awarded the Cornplanter Medal by the Cayuga County Historical Society. This was the 13th presentation of the medal since it was first struck in 1904.

Cooperative Work

The State Archeologist advised the University of Massachusetts Field School at Nantucket Island, Massachusetts; served as consultant to graduate students from Harvard, the University of Chicago, and the University of Toronto; served as advisor to the University of Syracuse field program in Iroquois research under James A. Tuck; and also evaluated manuscripts and assisted amateur collectors.

Other activities included examining and reporting on three finds of human skeletons for the State Police Laboratory and conferring with the director of the Adirondack Museum regarding an archeological survey of the Adirondack Mountains.

Both archeologists assisted colleagues at Hartwick College, Harpur College, and the State University at Geneseo with archeological problems. They also met with International Association for Quaternary Research scholars at the Dennis site in Menands, New York, and explained the cultural and geological significance of the site.



False Faces on the way to the Midwinter Festival at Onondaga February, 1925. Collected by Harold Blau during his study of Onondaga ceremonialism.

The Junior Archeologist conferred with the Director of the Hudson River Valley Commission and prepared for him a report on 10 important Indian sites needing preservation under the conservation program. In carrying out the State highway salvage program, Funk worked with State University groups at Buffalo and Binghamton and with the Nassau County Museum of Natural History.

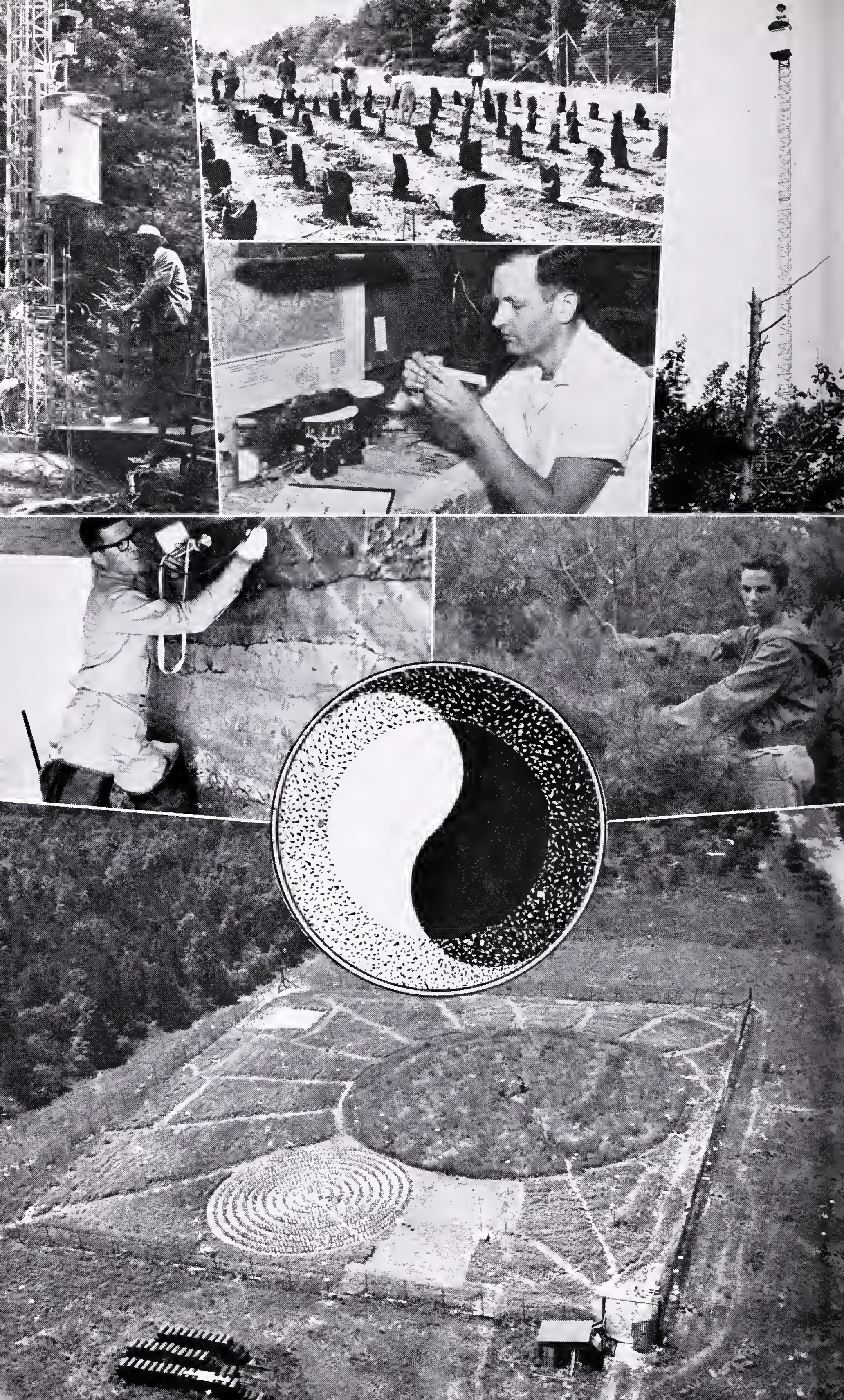
Funk also assisted a University of Missouri graduate student (a former survey field assistant), with data for a Master's thesis based on the Garoga site, a late prehistoric Mohawk Iroquois village in Ephratah, New York. The site represents the culmination of late prehistoric Iroquois community life.

Temporary personnel employed were: Thomas Abler, Student Honorarium Recipient, University of Toronto, Canada, who did field research on the history of the Seneca Nation, and Harold Blau, New York City Community College, a Science Research Expert who made a study of Onondaga ceremonies.

Local and out-of-town visitors totaling about 275 persons were received by the survey staff.

In June, the survey was awarded a new National Science Foundation grant for $17,300 for research in coastal ecology and adaptation in the Northeast.

WILLIAM A. RITCHIE
State Archeologist



BIOLOGICAL SURVEY

The Biological Survey comprises the sciences of botany, entomology and zoology. This grouping of disciplines not only recognizes the common objectives of research and service in the life sciences, but also facilitates a coordinated approach to complex, interrelated problems, such as water pollution and air pollution, which affect both animals and plants.

The research projects of the Biological Survey are mostly in the areas of natural resources and ecology, which include forest tree problems, specialized pollen studies, the preparation of the *Handbook of North American Birds* — and in the area of public health, comprising studies of airborne pollen and studies of blackflies, mosquitoes, and other biting arthropods, both as nuisances and as vectors of disease.

Natural Resources and Ecology

In Forest Entomology, Donald P. Connola is presently carrying on studies of the biological control of the gypsy moth, the causes of the rise and fall of gypsy moth populations, and the apparent resistance of certain white pines to the attack of the white pine weevil.

The principal gypsy moth work during 1965-66 was the field-testing of newer *Bacillus thuringiensis* formulations, which were made in an effort to incorporate desirable principles and eliminate undesirable features that had become apparent as a result of previous tests. The addition of Pinolene 1674 was found to extend the viability of the spores on the leaves beyond the expected extent, pointing to the need for more research in the laboratory, not only to produce a more virulent strain of *B. thuringiensis,* but to develop a more effective formulation through the use of "extenders."

Work on the white pine weevil study during the summer of 1965 was the third year of a long term project which, it is hoped, will lead to the selection and propagation of a strain of white pine that is resistant to weevil attack. Work consisted of continuing studies of weeviling on caged, potted trees from different sources, the sowing of white pine seeds from selected sources for future out-planting, and the locating of sites for the provenance plantings.

The potential importance of the findings to date in the study of the white pine weevil has led the entomologists to increasing emphasis on this work, with a corresponding curtailment of other programs. Most of the latter had reached a stage where no further productive work could be done without an outlay of money and time beyond our resources.

Another forest tree problem, the study of wood decaying fungi, is associated both directly and indirectly with concern over the increase in the dieback and deterioration from unknown causes of several tree species in the Northeast including, in particular, beech, oak, maple, and ash. The study of the role of fungi in the etiology of these conditions is an important part of the research being carried on by Dr. Rodney C. DeGroot, mycologist.

Research during the summer of 1965, beginning in late June, included a seasonal survey of airborne fungus spores near Raquette Lake in the central Adirondacks. Apparatus and techniques applicable to this work had already been developed in connection with studies of airborne pollen.

Throughout the sampling periods, the most frequent spores counted were basidiospores of *Ganoderma applanatus* and *Fomes fomentarius,* wood-decay fungi which attack a variety of hardwoods including birch and beech, and hyaline spores from unidentified sources. Present in small numbers throughout the summer were spores of *Chaetomium,* a coprophilous fungus, and of *Lasiosphaeria,* which attacks herbaceous plants. Twig-inhabiting fungi occurred only in small numbers during early July. Much variation in numbers of spores of *Alternaria* and *Hormodendrum* which along with certain others are allergenic, occurred throughout the summer.

In the pollen studies carried out by Donald M. Lewis (the pollen spectra of bog and lake sediments, and "pollen rain"), all of the samples of pollen from the bottom of Mohonk Lake and the Rhododendron Swamp near New Paltz were analyzed. Pollen diagrams for the Rhododendron Swamp site were prepared and show the following significant features: 1) a short but well-defined arctic-alpine zone — spruce with pine and tundra-like indicators; 2) a *Myriophyllum alterniflorum* (water millfoil) zone possibly correlating with the Two Creeks Interstadial, a warming period just before the last glacial advance; 3) a *Castanea* (Chestnut) period in the C3 pollen zone (of Deevey). The two latter features are unlike anything previously reported in New York State, but have certain similarities to New England pollen diagrams.

Publication of the pollen spectra study awaits a decision on the integration of the pollen analyses with certain diatom studies and, it is hoped, radiocarbon dates for key horizons.

Field and laboratory observations made during the contemporary "pollen rain" studies, and collection and counting of previous years, samples from the ground array at Brookhaven National Laboratory pointed the way toward improved sampling and laboratory techniques.

A sampling of airborne particulates continuing on the State Education Building Annex rooftop employing these new techniques was begun in March 1966. This provides field samples to complement laboratory studies of pollen germination characteristics as possible aids in identification of airborne pollen, the effectiveness, in all types of weather, of microscope slide adhesives, the comparative efficiency of deposition pollen samplers in rain, and other corollary problems which arise in devising accurate pollen rain samplers.

With respect to the pollen reference collection, some changes were made in processing and cataloging polliniferous material to give ready access to reference items and to identify future needs. All acetolyzed specimens in the pollen reference collections were stored in vials in three media: two percent phenol, ethyl cellosolve, and silicone oil. All collections of polliniferous material (either processed or not) were recorded in an inventory card file. Pollen desiderata from special check-lists (e.g. arctic-alpine, airborne, and Indian food and utility plants) were added to this file and especially coded for rapid reference. The availability of the pollen of any species and information as to processing and storage is now immediate. If new collections and preparations are faithfully recorded, information retrieval will be much less cumbersome than in the past.

Travels of airborne pollen, because of their orientation toward allergenic problems are discussed under the area of public health.

The continuing project of the State Zoologist, Dr. Ralph Palmer, the *Handbook of North American Bird* proceeded beyond the half-way point of the manuscript of Volume II which deals with waterfowl.

During the second season of collecting in St. Lawrence County, Dr. Paul F. Connor set up headquarters for the small mammal survey near Waddington and Colton. Over 400 small mammals, representing 22 species, were collected, with data sheets filed for 365 specimens.

Later activities included the final editing and proofing of the manuscript for a bulletin on the small mammals of the Tug Hill Plateau, and preparation for the establishment of new headquarters for the small mammal survey in the Shawangunk Mountain region. Areas are chosen for study because of special ecological interest, to gain information prior to excessive human encroachment, or to determine the potential of the animals of a given area as hosts of arthropod-borne disease organisms.

Area of Public Health

Because Dr. Eugene C. Ogden's studies of airborne pollen are related to allergies, the studies have been underwritten to date by substantial grants from the U. S. Public Health Service. Much time has been spent in devising and improving equipment and methods. Future work will utilize the experience and the devices thus developed and standardized.

During 1965-66, studies on the influence of forested areas on airborne pollen concentrations were continued at Brookhaven National Laboratory and in the Adirondack Mountains.

The work also included studies of dispersion and deposition from a known source over open terrain, and the assembling of a mobile unit for pollen dispersal studies.

Additional research was carried on near Oswego, New York. During May and June, when many kinds of tree pollens are in the atmosphere. Three types of samplers were operated to determine concentrations, diurnal variations, and correlations with wind direction and velocity. Oswego was chosen because it offered study of air masses passing over a large body of water.

Studies of arthropods of public health importance by Dr. Hugo A. Jamnback, Jr., and Robert Means included a final report of the Mosquito Survey in Massena. For most of the mosquito breeding areas ditching or draining was recommended as a permanent control measure. In the spring of 1966 the Massena Department of Public Works personnel were instructed in the correct methods for applying Abate insecticide to control larval mosquitoes. Later checks indicated that spraying was effective but many areas within the village limits were not sprayed until after the mosquitoes had pupated, resulting in no control at these sites.

In early March 1966, granular formulations of Abate were applied to the ice on mosquito breeding areas in Massena. The results, as checked in May, indicated that Abate might be useful under certain conditions as a winter mosquito larvicide.

The arbovirus survey in northern St. Lawrence County begun in 1964 was concluded in September 1965. Small animals and their ectoparasites as well as biting flies were collected in the survey. From these specimens several isolations of Powassan virus from both mammals and ticks and one of California Encephalitis Virus (CEV) from mosquitoes have been made to date by the Division of Laboratories and Research, New York State Health Department.

The other principal insect study was the evaluation of insecticides for use against blackfly larvae. During the spring and early summer of 1966, blackfly larvicides were tested, both in the laboratory at Cambridge, New York, using "Jamnback" troughs, and in the field on single streams in the Lowville area.

Dr. Jamnback spent the period September 15, 1965, to July 15, 1966, on Professional Development Leave at the London School of Hygiene and Tropical Medicine, taking courses leading to the Diploma in Applied Parasitology and Entomology.

DONALD L. COLLINS
Principal Scientist, Biology

6500
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GEOLOGICAL SURVEY

> The Geological Survey analyzes and synthesizes the events and life of New York State's ancient past in order to explain the modern physical environment as it pertains to rocks and minerals, ores and soils, and land forms. By research and service activities it serves as the State's specialist in the earth sciences and makes its data and interpretations available to the public by consultation and publication.

Greatly increased interdepartmental cooperation in the areas of environmental geology, planning for a variety of scientific gatherings, and the preparation of major grant proposals characterized the major activities of the Geological Survey during 1965-66.

The greatest increase in activity was in environmental geology — an increase which this year greatly strained our resources. Although most staff members contribute through their specialized knowledge to this program, the bulk of the planning, supervision and preparation of reports falls to the State Geologist and even more specifically to Dr. James F. Davis, assisted by Miss Karen Lukas, who filled a new Junior Scientist position, and by Wayne Stout, employed for the summer as a photogeologist.

The following was accomplished in the area of environmental geology:

> A summary report on the *Geology and Mineral Resources of the Middle and Lower Hudson Valley* which was partially supported by funds of the Hudson River Valley Commission. The report was co-authored by the State Geologist, by Davis, and by Dr. John H. Johnsen, professor of geology at Vassar College who was hired as a consultant by the Commission.
>
> Final preparation of a mineral resource map for the Interstate Commission on the Lake Champlain Basin.
>
> Final preparation of a plan for the proposed study of Long Island mineral resources for the N. Y. S. Office of Planning Coordination (formerly Office of Regional Planning).
>
> Served as supervisor and liaison between the Office of Planning Coordination and a consultant who contracted to map the carbonate rocks of Warren

and Washington Counties. This included negotiations on contracts, selection of support personnel and periodic field visitation.

Served as New York State's liaison for the Strip and Surface Mining Study Committee under the auspices of the Appalachian Regional Commission, and cooperated with the State Soil Conservationist of the U. S. Department of Agriculture in cataloging all open excavations for mineral materials within the State.

Prepared a proposal for the Governor's representative on the Appalachian Commission to inventory mineral resources in 17 Appalachian counties of southern New York State, and prepared an adjunct proposal with the N. Y. S. College of Ceramics to make a systematic evaluation of ceramic properties of clay and shale in these counties.

Advised the N. Y. S. Office of General Services in the selection of domestic building stones for structures in the South Mall proposed State office complex in Albany, and assisted in the selection of sampling localities in a study of concrete aggregate materials carried on for the N. Y. S. University Construction Fund by I. M. Pei Associates (architects) and by James R. Dunn and Associates (consulting geologists).

Provided bibliography, advice, and critical review for discussion of mineral resources in a summary report of the Schenectady County Planning Board.

Prepared an inventory of mineral resources of Wayne, Monroe, and Rensselaer Counties for the N. Y. S. Commerce Department.

A second major activity, planning for scientific gatherings, involved: Dr. Yngvar W. Isachsen, who served on the Organizing Committee for the Northeast Region-Geological Society of America and helped plan the first meeting at Philadelphia in February 1966, and was co-organizer of a forthcoming (October 1966) International Symposium on The Origin of Anorthosite; Dr. Lawrence V. Rickard and Dr. Donald W. Fisher, who each prepared a section for the guidebook of the N. Y. S. Geological Association, hosted by the State University of New York at Buffalo in May 1966; and the State Geologist who negotiated with the N. Y. S. Power Authority for permission for the Geological Association to inspect rock cuts at the new Robert H. Moses hydroelectric plant at Niagara Falls.

The preparation of major grant proposals included the State Geologist's proposal to the Water Resources Research Institute, U. S. Department of Interior, to financially support a comprehensive program to complete the mapping of glacial deposits in New York State at a scale of 1″=4 miles (the ensuing map would be published on the same base as and match the bedrock map published in 1962). He also prepared, under the direction of the Assistant Commissioner, a facilities proposal to the National Science Foundation to support the equipping of scientific offices and laboratories for the State Museum and Science Service in the proposed South Mall Cultural Center. He and Fisher cooperated in summarizing the Science Service staff's space and equipment requirements.

Programmed Research

The present research program of the Survey is a transitional one, based on specialization from its tradition, but with expanding activities in new fields of the geological sciences such as geochemistry, geophysics and environmental geology. The areas of programmed research in 1965-66 are categorized below.

Sedimentary Rocks: Approximately 60 percent of New York State is directly underlain by sedimentary rocks ranging in age from Cambrian to Cretaceous. Basic research on these rocks and their fossils is under the direction of the State Paleontologist. Fisher has completed the mapping of the Plattsburgh and Rouses Point quadrangles and is preparing the accompanying text. His mapping of Paleozoic rocks in the Mohawk Valley is about 90 percent complete.

Rickard has continued work on the biostratigraphic zonation of the Silurian Lower-Middle Devonian rocks of New York and, during the summer of 1966, he processed rock samples for conodont extraction. He also carried on a detailed study of the stratigraphy of the Salina, Helderberg, Ulster, and Onondaga Groups in subsurface New York and Pennsylvania, using lithic logs and gamma ray logs of most available wells. New interpretations of the number, relationship, and distribution of salt beds in New York State have important scientific and economic benefits. Further work on this project will result in a text accompanied by stratigraphic cross-sections, lithofacies, and isopachous maps.

Temporary personnel employed in sedimentary rock studies included Raymond Baschnagel, Delhi Central School, who assisted Harlan Banks of Cornell University in collecting plant fossils from the Catskills; John Bird, State University of New York at Albany, who did field mapping of Taconic rocks in the Stephentown Center and Hancock quadrangles; Kenneth Johnson, doctoral candidate at R.P.I. who investigated the Devonian "Tully" clastics in eastern New York; and William Kirchgasser, doctoral candidate at Cornell, who, while assisting Michael R. House of Oxford University in collecting goniatite cephalopods and measuring stratigraphic sections in western New York, continued his study of the Cashaqua fauna.

Crystalline Rocks: Igneous and metamorphic rocks are ordinarily classified together as crystalline rocks. In New York State, this includes the areas of the Adirondacks, the Hudson Highlands, and most of the New York City metropolitan area exclusive of Long Island. This work is under the direction of Isachsen, who, during the past field season, measured stratigraphic sections of the metamorphic rocks in the Crane Mountain area near Thurman, New York. He also wrote a 20-page section on the mineral deposits in the Precambrian of the northeastern United States as part of his summary account of the Precambrian rocks of that area, expanded a section on geological history, and made revisions in sections on anorthosite and metamorphism.

Isachsen, with Dr. R. Lynn Moxham, initiated a study of porphyroclastic material from Adirondack metanorthosite. He crushed and handsorted anorthosite drill cores for pure samples for chemical analysis and described and cataloged the numerous textural types of metanorthosite collected during a traverse across Mt. Colden. The goal is an understanding of the major and trace elements of the local and vertical variations in the main Adirondack metanorthosite massif.

Temporary personnel included Percy Crosby of Chicago State Teachers North, employed to extend work begun under Survey auspices but carried for the past 3 years with National Science Foundation funds. The project is re-map the Lake Placid quadrangle and study the relationships between the metanorthosite and meta-sedimentary rocks in that area. Leo Hall of Union College extended geological mapping work into Connecticut under the auspices of the Connecticut Geological Survey, and carried on laboratory work and writing on this problem pertinent to his study of the Westchester County area.

Economic Geology: Geological information on the earth materials of economic interest is carried on in a variety of ways in the Survey but research and compilation of data concerning mineral resources is basic to all of the service activities in this area. At the present time this is carried on by the State Geologist, by W. Lynn Kreidler, Arthur M. Van Tyne, Davis, and their associates.

In the general area of oil and gas geology, there has been a major shift in our activities during the report year. During the latter part of 1965, the Oil and Gas Division of the N. Y. S. Conservation Department was established and 4 field offices were manned in central and western New York. These offices have taken over the previous responsibilities of the Survey's Albany and Wellsville offices for visiting the deep wells being drilled in New York State.

In the future, survey geologists will concentrate on compilation and analysis of geological subsurface data and will leave the actual collection of statistical data and of engineering recommendations to the Conservation Department's Oil and Gas Division.

During the past year Kreidler has been engaged in groundwork necessary for transference of all of the Survey's oil and gas records to computer tapes. When this work is finished it will be possible to rapidly retrieve subsurface geological data and to manipulate it by computer techniques for geological research purposes. This work has been done with the cooperation of the State Education Department's Data Processing Division and especially Edwin L. Albrecht of that Division.

Van Tyne has assisted in the computer tapework and has carried on research on subsurface correlation of the Silurian-Clinton Group in New York State. He also engaged in determining formation tops from well cuttings and gamma ray-neutron logs throughout the geologic section.

Davis, with the assistance of Lukas, initiated a study of sand and gravel resources in Dutchess County. Their assistants were Wayne Stout and Linda Kowalski. The Dutchess County project included field mapping and sampling of all deposits in the county, description of pebble population lithologies, and pilot development of methods of separation of pebbles on the basis of rock type.

The final report will also include an inventory of well drillers' data for the subsurface, an inventory of zoning regulations which may control open excavations, air photo and soil map interpretations to augment field data, and a semiquantitative estimate of reserves. Davis also made an X-ray study of the carbonate cement of gravel in the Pleistocene Dutchess County deposits.

Geochemistry and Geophysics: The report year was marked by Moxham's completion of a program to organize the analytical facilities of the Survey and provide rock and mineral analysis schemes at major and trace levels for the majority of earth materials. Standard X-ray pellet preparation techniques using analyzed rock standards were developed and the development of spectrographic techniques was completed.

Spectrographic technique methods were checked out on standard materials available from a number of sources throughout the world. The results were published but have not yet appeared in print. Subsequently, the laboratory analyzed a number of National Bureau of Standards materials on which trace analytical data are being sought.

With the assistance of Henry Rauch, graduate student at Alfred University, work was begun in the summer of 1965 on the suite of samples collected by Isachsen and Moxham from the west face of Mt. Colden. During the winter and spring of 1966, Moxham worked with Professors Brian Bayly of R.P.I. and William Fox of Williams College on a multi-variate factor analysis problem of trace elements in some hornblende and biotite data on hand. The program successfully identified a small number of element groups responsible for the variants in the matrix of data. Compilation of these data, submitted for publication, represents probably the first application of this technique to analytical data of this type.

Service Activities

Services of staff members were of four types — within the State Education Department, with other State departments, with the U. S. government, and with taxpayers.

Within the Department the State Geologist served as temporary secretary to the Committee on Science and Technology and served on the Professional Development Leave Committee.

Recommendations concerning New York State's role in the Interstate Mining Compact were made to the Executive Department by the State Geologist. These recommendations were followed by the introduction of legislation concerning this matter. The State Geologist continued as consultant to the Western New York Nuclear Service Center operation of the State Atomic and Space Development Commission and attended a hearing on the expansion of the Commonwealth Edison Indian Point nuclear power plant. Requests for data by the Commerce and Conservation Departments were handled by several staff members.

Services to Federal government departments included Davis' work of reviewing commodity reports in the Appalachian region for the U. S. Bureau of Mines, assisting the Bureau in the annual canvass of mineral producers within the State, and advising them on the preparation of new canvass forms for commodities produced. He also reviewed the 1964 mineral industries chapter dealing with New York State for the Bureau's Mines Yearbook. Van Tyne supplied data to the U. S. Geological Survey, Ground-water Division, concerning the Genesee River Basin study and assisted the U. S. Bureau of Mines by supplying shallow oil field data.

Taxpayer services are the contribution of all staff members. Items of particular significance were Fisher's leadership of two field trips for the Summer Institute of Man and Science at Rensselaerville, New York; Isachsen's aerial field trip (eight ½-hour flights) for 32 earth science teachers in the Lake George region; and the services supplied by Van Tyne in the Wellsville oil and gas office.

Other Activities

Fisher continued to serve as advisor for exhibits being prepared in Paleontology Hall of the State Museum and planned an exhibit comparing recent and fossil cryptozoon for the Geological Society of America offices in New York City. Another portion of this was planned by Isachsen and Roger Borst, all in cooperation with the exhibit designers and planners of the State Museum. Van Tyne, in the Wellsville office, examined and identified specimens brought into the office during the year and developed a small office exhibit for the edification of visitors.

In the area of general housekeeping, Moxham spent some time in February and March 1966, for an assessment of equipment on hand and an appraisal of equipment needed over future years, making certain assumptions on our future course in research and service. These data were gathered for the purpose of submission as part of the N.S.F. facilities proposal. In the report year, the geochemical laboratories were improved by addition of a large rock pulverizer and a pellet press for use in X-ray fluorescence determination of elemental analysis of rocks and minerals.

Davis acquired an extensive collection of New York State building stones for use as reference materials with architects and contractors. Isachsen supervised the filing of some 1,000 aerial photographs. Kreidler added to his collection of Geologs and mechanical logs of oil and gas wells. Richard Foster was temporarily employed in the Albany office to locate on 15′ and 7½′ quadrangles, wells drilled in New York State during 1965 and to prepare work sheets for these wells.

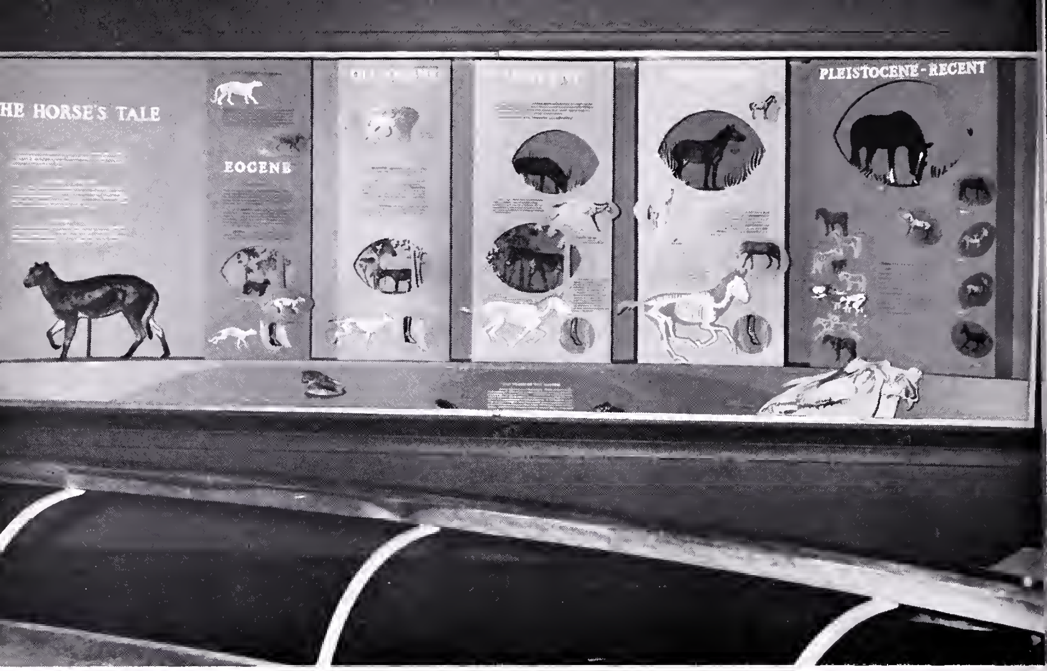
In the Wellsville office, Van Tyne collected over 100,000 feet of well cuttings and, under his supervision, these were cut, cataloged, and filed in paper envelopes. Approximately 20,000 feet of deep well cuttings were transferred to Albany. In addition, more than 2,000 samples of New York well cuttings were received from the Ohio Geological Survey and more than 6,600 samples of New York well cuttings formerly held by the Pennsylvania Geological Survey. New shelves for storing samples were built in the basement of the building in which the Wellsville office is located and an assistant was hired to cut samples.

Three members of the staff were granted full tuition and expense leaves by the Department for planned attendance at specialized short courses. The State Geologist was granted leave to attend a month-long course at M.I.T. on management of research and development; Moxham, a course at Purdue University entitled "Introduction to Chemical Instrumentation," and Kreidler, a course at the University of Michigan on "Computer Techniques for the Petroleum Geologist." Unfortunately, only Kreidler was able to attend; the other courses were over-subscribed.

In addition to staff services of reviewing or editing 11 publications ranging from *Geology of New York State—A Short Account* to *The Bibliography of Paper Bound Books* *of Interest to Teachers of Earth Science,* the survey publishes a tri-annual newsletter, the *New York State Geogram.*

Visiting scientists who spent time in research activities in the survey's offices and laboratories included Michael House, Oxford University, Oxford, England; William A. Oliver, Jr., U. S. Geological Survey, Washington, D. C.; W. B. Ian Rolfe, University of Manchester, England; and Ronald Tripp, Kent, England.

JOHN G. BROUGHTON
State Geologist



Two of the many popular Museum exhibits

State Museum

A CONTINUED INCREASE in attendance by the general public and by school groups who came to the State Museum for class instruction was again recorded in 1965-66. However, it is not the statistics that are mainly significant — the impact of the State Museum on its visitors is what matters.

Especially important for the education staff, who scheduled group instruction for almost 25,000 school students, was the evidence of progress that has been made in establishing communication between the individual child and the exhibit — so that the child learns not so much from the Museum Instructor as from the exhibit itself.

MUSEUM EXHIBITS

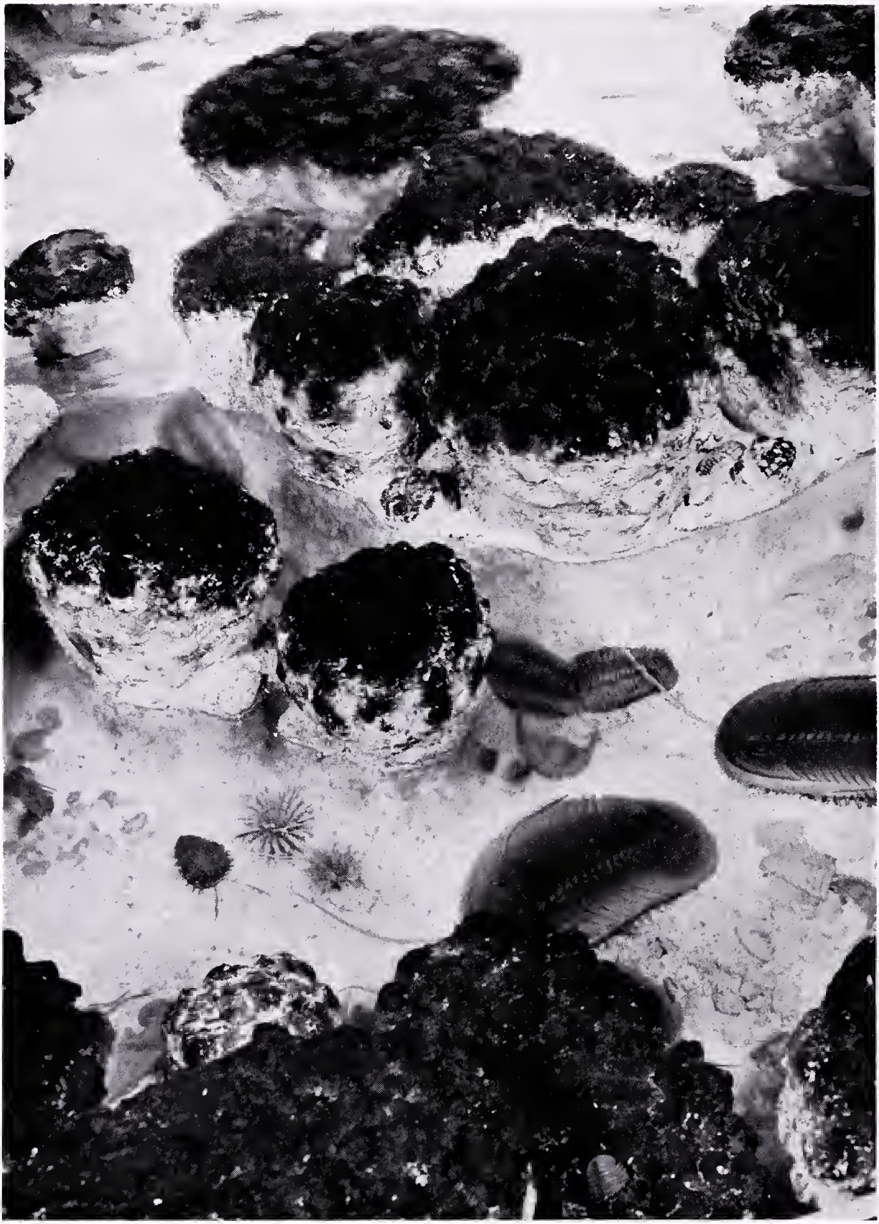
Variations of the 'Possum, a presentation of the principles of dispersal and adaptive radiation, and *The Microscopic World Unfolds* showing greatly enlarged models of four delicately structured protistids or single-celled organisms, on display in Paleontology Hall, are two of eight exhibits completed and opened to the public during the year.

The original North American 'possum was selected to trace the ecological principles of dispersal and adaptive radiation through time and space because the 'possum is a familiar creature to most people.

In the microscopic world exhibit, protistids were selected for display because of their importance in the fossil record.

Other completed exhibits in Paleontology Hall are the model of a giant eurypterid, *Pterygotus buffaloensis,* which resembles a monstrous 10-foot crayfish, two exhibits on recently recognized classes of mollusks, and two exhibits planned in response to specific requests for help from teachers accompanying school groups.

The requested exhibits, researched and constructed as a cooperative project between the Exhibits Division and the Museum Education Office are: *The Horse's Tale* and *Meet Some Dinosaurs.*



A close-up of a Paleontology Hall exhibit, "Late Cambrian, 510 million years ago." Pictured is an algal reef of Cryptozoons, a form of plant life which thrived in the shallow intertidal zone of warm, very salty marine waters.

The Horse's Tale is a graphic chronicle of the process of evolution in the genus Equus, and *Meet Some Dinosaurs* a synoptic exhibit of the fossil reptiles, utilizing small scale models to show the diversity of forms and including a full-size cast of a Brontosaurus footprint from a Texas mudflat of 120 million years ago.

In Biology Hall, the wolf, a former New York State inhabitant, is the subject of a diorama depicting a group of three wolves in a winter landscape.

Temporary exhibits, topical or timely, shown by the State Museum included photographs taken by the late Bernard J. Kolenberg while on an Associated Press assignment in Vietnam and entitled *The Faces of Vietnam*. Also scheduled was a display of the New York State Science Congress winning projects and a traveling exhibit, *Your Pure Food and Drug Law,* put on in cooperation with the U. S. Department of Health, Education and Welfare.

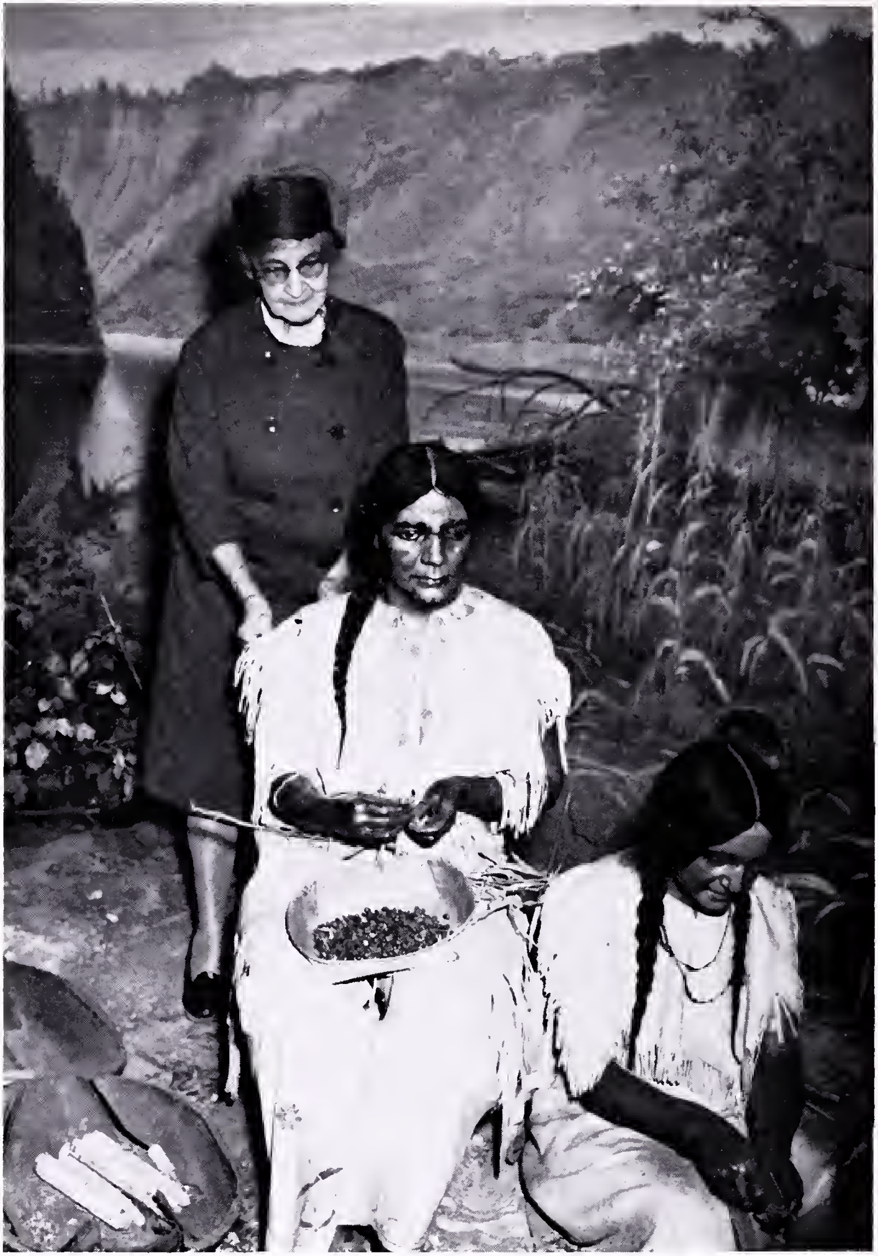
In anticipation of future involvement in the exhibition and interpretation of historical materials in the proposed Cultural Center, members of the Exhibits Division and the Education Office were encouraged to attend week-long seminars in American history given at Cooperstown by the New York State Historical Association.

A schedule of field trips to other museums, archeological excavations, and commercial display manufacturers for interpretation personnel was oriented toward the possible usefulness of the experience in the expanded State Museum.

MUSEUM EDUCATION

Part of the progress that has been made in establishing communication between the visiting school child and the exhibit is the Museum Instructor's use of printed lesson sheets which have been developed by the staff.

After a school class has been given a brief orientation in a museum classroom or in the exhibit hall, the children are given lesson sheets to work out for themselves. The lesson sheets refer them to specific exhibits. They are encouraged to explore a field of study as presented in a particular museum hall — Indian, Biology, Geology and Paleontology — until they can answer the questions asked on the sheet.



An October, 1965, visitor was Mrs. Maud Hurd, a Seneca matron, who worked with her mother on the State Museum Indian groups. Mrs. Hurd is standing by one of the exhibits for which she posed. The exhibits' Indian casts were made during the period 1906-1911 by sculptors Casper Mayer of New York and Henri Marchand of Buffalo.

The immediate response of both students and their teachers to this type of museum lesson has been generally favorable. It is the delayed information coming back to the education staff from parents, teachers, and the children themselves which has been most gratifying. The pleasure of learning, elementary an observation as this may seem, is a powerful motivation for return visits.

Other interpretive efforts which extend the resources of the State Museum throughout New York State were loans of boxed sets of natural objects and artifacts, ranging from *Medium-sized Mammal Study Skins* to *Iroquois Masks.*

The Education Office distributed various educational leaflets to New York State teachers, including two new publications, *Guide Book for Geological Field Trips in the Mohawk Valley and Lake George Regions,* and *The New York State Museum.*

Teacher workshop attendance during 1965-66 totaled 156 participants for workshops on entomology, Mohawk Valley geology, aerial geology, geochemistry, and wood decay. Staff curators and scientists led the workshops.

MUSEUM CURATORS

The six Museum curators work within their specialty by accumulating and maintaining the collections, by keeping collection records, by making the collections available for reference, research, and museum extension, and by doing both laboratory and field research within the specialty.

A survey of the Hudson River drainage for sites which should be preserved because of rare biota or ecological niches was prepared for the Hudson River Valley Commission by the curators of botany and zoology.

Other projects carried on by the curators were:

Archeology. The collections were opened for study or questions were answered on Indian life and artifacts for visiting scientists, students, and the general public. Scientists and students were from the University of Missouri; Columbia University College for Teachers; Franklin and Marshall College; the Museum of the American Indian-Heye Foundation; the Rijksmuseum voor Volkerkunde, Leiden, Holland; Queens College;

the Smithsonian Institution; the Indian Museum at Marathon, Florida; the Berkshire Museum at Pittsfield, Massachusetts; and the Adirondack Museum, Blue Mountain Lake, New York. Objects from the Anthropological Survey's Garoga excavations were catalogued and progress has been made in devising a decimally based system for the classification of all anthropological material.

Botany. The *Checklist of Grasses of New York State* was issued in October 1965. Work continued on the checklists of various groups of vascular plants in New York State, with first drafts of lists of Pteridophytes and Conifers prepared and considerable work done on matching lists of Sedges and the remaining Monocots. Over 6,000 collections of plants were accessioned including the gifts of 30 individuals and institutions and contributions from Biological Survey staff members.

Entomology. Research activities dealt with the identification and classification of the leaf beetles (Chrysomelidae: Coleoptera). A checklist of the 5,500 species of the leaf beetle subfamily Galerucinae was completed in manuscript form, and State Museum Bulletin 400, *A Synopsis of the North American Galerucinae* was published. Insect exhibits or portions of the collection were loaned to several institutions including Cornell University, the University of California, Berkeley; the U. S. National Museum, Washington, D. C., and the New York State Departments of Agriculture and Conservation.

Zoology. A vegetative and wildlife survey of Long Island, requested by the N. Y. S. Office of Planning Coordination, was initiated. Collections and gifts including items from the field work of Biological Survey scientists resulted in 3,112 specimens being catalogued and sorted into the collection. Work continued on an *Atlas of American Passerine Birds*, on the teaching aid *Mammals of New York* for the Educational Leaflet series, and on maps of bird ranges for the *Handbook of North American Birds*.

Paleontology. Visiting scientists who were assisted in their study of portions of the fossil collections were from the University Museum, Oxford, England, the University of Massachusetts at Amherst, the U. S. Geological Survey, Washington, D. C., the American Museum of Natural History, New York City, St. Lawrence University at Canton, New York, Syracuse University, Syracuse, New York, and Harvard University, Cambridge, Massachusetts.

PUBLICATIONS

Eight Museum bulletins, including an annual report; 3 map and chart series; 1 educational leaflet, and 11 miscellaneous publications of newsletter type were printed in 1965-66. The staff published 22 papers in outside media.

At the close of the year, four manuscripts had been accepted for publication.

State Museum and Science Service

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Ritchie, W. A.

1965 The Archaeology of New York State. *Natural History Press.* pp. 392.

Van Tyne, A. M.

1966 Annual Report, Oil and Gas Activity in New York for International Oil Scouts Assoc. *Annual Yearbook,* vol. xxxvi, pt. 1

Weinman, P. L.

1966 Museum Sponsored Aerial Geological Field Trips. *Museologist,* no. 99, pp. 9-12.

Whitney, E. & Jamnback, H.

1965 The First Isolations of Powassan Virus in New York State. *Proc. Soc. Expt. Biol. & Med.* 119:432-435.

Appendix A

1966 GRADUATE STUDENT HONORARIA RECIPIENTS

Anthropology

Abler, Thomas S., University of Toronto, Toronto, Canada An ethnohistorical study in purposeful culture change: the Seneca Nation, 1848-1965	$ 684

Botany

*Ginns, James H. Taxonomic study of species of *Merulius* in New State	360
Miller, Norton G., Michigan State University Pollen analysis and paleoecology of late- and post-glacial deposits in Western New York State.	684

Geology

*Harrington, Jonathan W., Cornell University Taxonomy, morphologic variation, and distribution of the rhynchonellid brachiopods of the New York Frasnian	480
Keegan, Janice W., Rensselaer Polytechnic Institute Reconstruction of Pleistocene history in central Mohawk Valley	600
*Letteney, Cole D., Syracuse University Study of Thirteenth Lake dome, southcentral Adirondack Highlands	480
Lewis, John R., Syracuse University Structural analysis of Rossie complex, NW. Adirondacks	600
Schwarzer, Theresa F., Rensselaer Polytechnic Institute Analyzation of pegmatites	408
*Walker, Kenneth R., Yale University Paleoecology of the Ordovician Black River Group	600

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* Renewal.

Zoology

Jenkins, Robert E., Cornell University Reproductive behavior of nest-building minnows	252
Krieg, David C., St. Bonaventure University Study of Eastern Bluebird	480
	$5,628

Appendix B

CONFERENCES AND PROFESSIONAL meetings in which the Museum and Science Service staff participated and offices held by staff:

American Academy of Allergy, New York City — Ogden**

American Anthropological Association, annual meeting, Denver, Colo. — Fenton**

American Association of Economic Entomologists, New Orleans, La.—Collins* **

American Association of Museums, annual meeting, Chicago, Ill. — Cahalane, Fenton

American Chemical Society, Eastern Analytical Symposium, New York City and Symposium on Chemistry of Natural Waters, Pittsburgh, Pa. — Moxham

American Committee for International Wildlife Protection, New York City — Cahalane

American Institute of Professional Geologists, New York City — Broughton, Davis

American Mosquito Control Association, annual meeting, Atlanta, Ga.—Collins* **

American Ornithologists' Union, annual meeting, Columbus, Ohio — Cahalane**, Palmer

American Phytopathological Society, annual meeting of Northeastern Division, Geneva, N. Y.; annual meeting, Miami, Fla. — De Groot

Annual Field Conference of Grenville Geologists, Gouverneur, N. Y. — Davis, Isachsen, Moxham

Association of American State Geologists, Bloomington, Ind. & Charlottesville, Va. — Broughton**

Association of Science Museum Directors, annual meeting, Milwaukee, Wis.—Cahalane

Bicentennial Celebration of Smithsonian Institution, Washington, D. C. — Fenton

Biennial Vector Control Conference, Atlanta, Ga.—Collins* **

Commissioner's Staff Conference, Diamond Point. N. Y. — Fenton

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* Gave paper or address.
** Holder of office in organization.

Conference on Iroquois Research, Glens Falls, N. Y.— Fenton*, Funk*, Gillette, Chatfield, Ritchie*

Cornplanter Medal Award Dinner, Auburn, N. Y.— Fenton**

Council of State Governments, St. Louis, Mo.— Broughton

Defenders of Wildlife, Inc., annual and executive committee meetings, Washington, D. C.— Cahalane**

Eastern States Archeological Federation, annual meeting, Princeton & Trenton, N. J.— Funk*, Ritchie

Entomological Society of America, Eastern Branch meeting, Philadelphia, Pa.— Connola*

Geological Society of America, annual meeting, Kansas City, Mo.— Davis; Northeastern Sectional Meeting, Philadelphia, Pa.— Broughton**, Davis, Isachsen**, Lukas, Moxham

Geological Society of Canada, Symposium of Geochemical Prospecting, Ottawa, Ont., Canada — Moxham

Interdepartmental Rabies Committee Meeting, Albany, N. Y.— Connor, Palmer

International Union of Anthropological and Ethnological Sciences, London, England — Fenton

Interstate Commission on Lake Champlain Basin, Burlington, Vt.— Davis

Middletown Scientific Assoc., University of Massachusetts, Amherst — Broughton

New England Botanical Club, Cambridge, Mass.— Ogden

New England Intercollegiate Field Conference, Brunswick, Me.— Davis

New Jersey Mosquito Extermination Association, annual meeting, Atlantic City, N. J.—Collins, Means *

New York State Archeological Association, annual meeting, Buffalo, N. Y.— Funk*, Gillette, Ritchie*

New York State Association of Museums, Buffalo, N. Y.— Fenton

New York State Department of Agriculture and Markets, annual meeting, Johnstown, N. Y.— Connola*

New York State Geological Association, Buffalo & Niagara Falls, N. Y.— Fisher, Kreidler, Lukas, Rickard, Van Tyne

New York State Pesticide Control, board meetings, Geneva, Albany & Ithaca, N. Y.—Collins **

New York Zoological Society, annual meeting, New York City — Cahalane

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* Gave paper or address.

** Holder of office in organization.

North American Wildlife Conference (31st), Pittsburgh, Pa.— Cahalane

Northeastern Anthropological Conference, annual meeting, Amherst, Mass.— Funk*, Ritchie*

Northeastern Conference on Mosquito Suppression and Wildlife Management, Newton, Mass.— Collins*

Northeastern Forest Pathologists' Workshop, Amherst, Mass.— DeGroot

Northeastern Forest Pest Council Meeting, Boston, Mass. — Connola, DeGroot; Hyannis, Mass.— Connola

Northeastern Forest Soils Conference, Orillia, Ont., Canada — Connola

Northeastern Forest Tree Improvement Conference, Albany, N. Y.— Connola*

Northeastern Weed Control Conference, New York City — Ogden

Northeast Museums Conference, Albany, N. Y.— Cahalane, Fenton, Gillette

Northern Appalachian Geological Society, Wellsville, N. Y. — Van Tyne

Paleontological Research Institution, Ithaca, N. Y.— Fisher**, Rickard

Peck Mycological Foray, Lake Colby, N. Y.— Smith

Penn-Grade Crude Oil Producers Association, Bradford, Pa.— Van Tyne

Smithsonian Institution, Conference on Urgent Tasks in Ethnography, Washington, D. C.— Fenton

Society for American Archeology, annual meeting, Reno, Nevada — Ritchie*

Society of American Foresters, N. Y. Section Meeting, Albany, N. Y.— Connola

Southeastern Archeological Conference, annual meeting, Macon, Ga.— Ritchie

State Natural Resources Committee for Cornell and Syracuse Universities, Albany, Shackleton Point and Syracuse, N.Y. — Cahalane, Collins

University of Massachusetts, conference on economic geology, Amherst, Mass.— Broughton*, Davis

USSR, IVth All-Union Ornithological Conference, Alma-Ata, Kazakhstan, Russia — Palmer

Wildlife Society, annual meeting, Washington, D. C.— Cahalane; N. Y. Chapter, Syracuse, N. Y.— Connor

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* Gave paper or address.

** Holder of office in organization.

Appendix C

COOPERATIVE WORK (SERVICE): Extension program by the staff of the State Museum and Science Service to various groups:

Adirondack Center — Fenton
Adirondack Mountain Club, Albany Chapter — Cahalane*
Adirondack Museum — Fenton
Alan Devoe Bird Club — Connor*
Albany Rotary Club — Ritchie*
Albany Travel Club — Ritchie*
American Mosquito Control Association — Collins
American Museum of Natural History — Fenton, Palmer
American Petroleum Institute — N.Y.S. Oil Producers Association — Van Tyne
Association of Town Highway Superintendents, Allegheny County — Van Tyne
Atmospheric Science Research Center — Smith
Birch Country Garden Club — Smith*
British Museum (London, Eng.) — Fenton
Buffalo Museum of Science — Smith
Cayuga County Historical Society — Ritchie*
City Club of Albany — Fenton*
Colonie Central High School — Gillette*
Cooperstown Indian Museum — Ritchie
Dartmouth College — Fenton*
Eagle Claw Society of Ticonderoga — Gillette
Fordham University — Fenton
Hartwick College — Fenton
Horniman Museum (London, Eng.) — Fenton
Horticultural Society of Delaware County, N. Y.— Smith*
Hudson River Valley Commission — Broughton, Davis, Reilly, Smith
Institute on Man and Science at Rensselaerville — Fenton*
Junior Friday Morning Club — Fenton*
Kiwanis Club (Glens Falls) — Fenton*
Metropolitan Museum of Art — Fenton
Mount Saint Vincent College — Fenton

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* Gave talk.

Nassau County Museum — Funk, Gillette
National Herbarium of Canada — Smith
New York Botanical Garden — Smith
New York State Archeological Association, Auringer-Seelye Chapter; Orange County Chapter; Van Epps-Hartley Chapter — Funk*, Gillette, Ritchie*
New York State Bureau of Criminal Investigation — Smith
New York State Police Laboratory — Gillette, Ritchie
Ohio Wesleyan University — Lewis
Pitt Rivers Museum (Oxford, Eng.) — Fenton
Robert A. Taft Sanitary Engineering Center — DeGroot, Lewis
Rochester Museum of Arts and Sciences — Gillette
Royal Anthropological Institute of Great Britian & Ireland — Fenton
Seminar on Puerto Rican Culture — Fenton
Seneca Nation of Indians Planning Committee for Iroquoia — Fenton
Shaker Museum Foundation — Fenton
State Committee on Natural Resources Research—Cahalane, Fenton
State University of New York at Albany — Broughton
St. Peter's Church Men's Group — Fenton*
Torrey Botanical Club — Smith*
University of California — Lewis
University of Leiden (Holland) — Fenton
University of Michigan — Smith
U.S. Army Camp Drum — Collins, Means
Vassar College — Fenton
Warwick Castle — Fenton
Wellsville Rotary Club — Van Tyne
Wellsville Torch Club — Van Tyne
Yale University — Collins
YWCA — Ritchie*

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* Gave talk.

Appendix D

Cooperating Agencies

A continuing function of the Museum and Science Service is to cooperate with agencies and organizations concerned with museum and research activities in this and other states; with the governments of the United States and Canada; with universities and industry in the discovery, analysis, and dissemination of scientific information. These contacts frequently include reciprocal services, often arise out of personal staff contacts and, if so listed, would measure individual participation, but are here tabulated by organization.

Adirondack Museum
American Cyanamid Company
American Geological Institute
American Mosquito Control Association
American Ornithologists' Union
Antioch College
Appalachian Regional Commission
Bioferm Company
Brookhaven National Laboratory
Carbon and Carbide Chemical Company
Chemagro Corporation
Colgate University
Duflo Air Service
Elwood Museum
Florida State Board of Health Laboratory
Fort William Henry
Hartwick College
Harvard University
Hudson River Valley Commission
Interstate Commission on Lake Champlain Basin
Interstate Oil Compact Commission
National Institutes of Health
National Museum of Canada
New York City Health Department
New York Zoological Society
Rensselaer Polytechnic Institute
Rutgers University
Schenectady County Planning Board
Schenectady Museum
State Atomic and Space Development Commission

State Department of Agriculture and Markets
State Department of Commerce
State Department of Conservation
State Department of Health
State Department of Public Works
State Office of General Services
State Office of Planning Coordination
State Power Authority
State University College of Agriculture at Cornell University
State University College of Ceramics at Alfred University
State University College at Binghamton
State University College at Buffalo
State University College at Geneseo
State University College at Potsdam
State University College of Forestry at Syracuse University
State University Construction Fund
State University of New York at Albany
Stauffer Chemical Company
Suffolk County Mosquito Control Commission
Syracuse University
University of Chicago
University of Connecticut
University of Massachusetts
University of Toronto
U.S. Department of Agriculture
U.S. Bureau of Mines
U.S. Forest Service
U.S. Geological Survey
U.S. Public Health Service
World Health Organization

Entire Manuscript Set in Garamond

New York Botanical Garden Library
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